Before the
Federal Communications Commission
Washington, D.C. 20554

In the Matter of	)	
	)	
An Inquiry into the Commission's	)	
Policies and Rules Regarding AM	)	MM Docket No. 93-177
Radio Service Directional Antenna	)	RM-7594
Performance Verification	)	

Comments of Potomac Instruments, inc.

I. Introduction

In the interest of fostering the continuing development and improvement of the medium-wave broadcast service, Potomac Instruments, inc., ("**PI")** hereby submits its comments in response to the above referenced Report and Order and Further Notice of Proposed Rule Making adopted February 14, 2001 and released March 7, 2001.

PI has been actively engaged in ongoing industry dialog relating to the effective implementation of current state-of-the-art methodology for computer modeling of AM Directional Antenna Arrays for the past decade. We have participated in the recent series of *ad hoc* forums hosted by the National Association of Broadcasters ("NAB") between October 1999 and June 2001. We have also joined with the NAB and other interested parties in the "Joint" filing of comments before the Federal Communications Commission ("Commission") on this matter.

II. Background

PI is firmly convinced that computer moment method modeling provides, to the competent directional antenna array design engineer, a powerful tool for designing and tuning directional antenna arrays. Also, when integrated with the new "Rules" adopted on February 14, 2001, we believe that regulatory acceptance of computer antenna array modeling should result in significant engineering cost reduction to station owners who are, or will be, constructing new antenna arrays or modifying existing

antenna arrays. We also commend the Commission for its recent adoption of revised rules that seem to strike a proper balance between regulatory relief and regulatory oversight for the mutual benefit of the broadcast industry and the listener/consumer.

III. Method of Moments ("MOM") Modeling and Proofs of Performance

The MOM *ad hoc* Group, in order to reach a consensus and establish threshold criteria for rulemaking purposes, has endeavored to define antenna arrays that are best case candidates for MOM modeling. The specific requirements for array design, sampling systems, array environment, and computer model criteria are set forth, in detail, in a separate JOINT COMMENTS OF BROADCASTERS, BROADCAST ENGINEERING CONSULTANTS, AND EQUIPMENT MANUFACTURERS filing. The *ad hoc* group has approached this issue by agreeing to eliminate, for purposes of this proceeding, any consideration of any antenna array whose basic design, site anomalies, tower configuration, or sampling system would or could conceivably distort the model's current distribution calculations for the antenna array elements. By so doing, it is collectively believed that a MOM model confidence factor will emerge, over time, which will justify even greater reliance upon computer generated models that cover a wider variety of antenna arrays in the future.

In previous comments, under this proceeding, **PI** has expressed concern about the potential for increased radio frequency interference related to the adoption of a proof of performance policy that does not include requirements for, independently verifiable, field strength benchmark data to confirm station operation within licensed parameters. We have postulated that directional antenna arrays, once tuned and proofed, are not steady state devices. Their physical parameters will, and do, change with time, climatic conditions, and various dynamic external physical influences. We wonder, absent field strength measurement data, Is there another suitable means for off site verification of antenna pattern compliance?

Directional antenna design, physical construction and level of maintenance are the primary determinants of an antenna array's stability. Therefore, an antenna array that is proofed by field strength measurement is, inherently, no more or less stable than an array that is proofed by MOM model. What

would be different about a stand-alone MOM proof of performance would be the elimination of publicly archived baseline field strength measurement data. This seems to beg the question: Would either the broadcast industry or the listening public benefit from regulations in which interference issues would, ultimately, be resolved through civil litigation rather than regulatory enforcement?

IV. Monitoring the MOM Modeled Antenna Array

The medium-wave radio station of the not-too-distant future may be multiplexed in the radio frequency ("RF") domain with other radio stations on the same towers. The same radio station may be broadcasting a hybrid modulation format consisting of a mixture of asymmetrical double sideband amplitude modulation and coded orthogonal digital multiplexing. Each of these innovations represent instrumentation challenges to the manufacturers of antenna monitors.

In a medium-wave broadcast facility employing a directional antenna array, the station's antenna monitor is, clearly, the primary instrumentation for continuous monitoring of antenna current magnitudes and relative phase angles. (With the recent elimination of the requirement for antenna base current meters the antenna monitor may provide the station's only indication of antenna currents.) It is this relative relationship of the individual tower currents, as indicated by the antenna monitor, that provides the licensee with reasonable assurance that the station is operating within authorized antenna pattern tolerances on a day-to-day basis. With the implementation of MOM modeling of antenna arrays, the certifiable accuracy of the antenna monitor becomes a more critical factor because the antenna monitor represents the primary standard, against which, the array will be tuned to modeled parameters. Accordingly, we believe that the station's antenna monitor should be calibrated by a qualified calibration laboratory immediately prior to the initial tuning of the array and then periodically thereafter.

PI believes that current generation antenna monitors are capable of coping with the challenges presented by foreseeable technology demands. In the event that auto logging and/or Internet posting of real-time data is deemed necessary to for purposes of independent verification of operating parameters, existing antenna monitors may be adapted to that purpose. We further believe that it would be possible

to develop fixed location, weather resistant, field strength monitors for single-point monitoring of critical radials at antenna property boundaries.

V. Conclusion

As a joint filer **PI** believes that the recommendations presented in the JOINT COMMENTS OF BROADCASTERS, BROADCAST ENGINEERING CONSULTANTS, AND EQUIPMENT MANUFACTURERS are based upon sound engineering judgement and the collective knowledge of the broadcast industry. Further we believe that method of moments modeling proofs of performance should be authorized for certain medium-wave broadcast directional antenna arrays. We have set forth above our concerns about the lack of independently verifiable field strength data and we have suggested alternative means for collecting operational data for public access. We also have reiterated our recommendation for periodic certification of antenna monitors used for monitoring computer model proofed antenna arrays.

Respectfully submitted,
Potomac Instruments, inc.

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David G. Harry, VP